



## Engineering Computer

# Road Transportable Analytical Laboratory (RTAL)

### Technology Need:

Faster and cheaper methods of obtaining critical environmental analytical data are needed while maintaining the appropriate levels of quality assurance and quality control.

### Technology Description:

The RTAL was developed to meet the unique needs of the Department of Energy (DOE) for rapid, on-site, low cost, and accurate analysis of environmental samples (soil, groundwater, and surface waters) for all contaminants of concern, including radionuclides. The RTAL design makes maximal use of laboratory automation and robotics technologies to dramatically shorten turnaround time and lower analytical costs while maintaining the highest levels of quality assurance and control.

The RTAL fully analyzes samples within 16 hours, providing critical analytical data several days, weeks, or months faster than is currently achievable. Cost analyses show potential savings of several million dollars per year for each RTAL system deployed compared to current central laboratory costs.

The RTAL system consists of a set of individual laboratory modules deployable independently or as an interconnected group to meet individual site needs. Each module provides full protection for operations and sensitive analytical equipment against radioactive particulates and conventional environmental contaminants. Each module is shock and vibration protected to prevent damage during transport and operation, and has its own electrical generation and HVAC systems. When interconnected, the modules provide backup utilities for each other to ensure a high degree of performance reliability. The individual



RTAL modules are:

<The Radioanalytical Laboratory provides the shielded analytical and laboratory support equipment necessary for analysis of alpha, beta, and gamma emitting radionuclides.

<The Organic and Inorganic Chemical Analysis Laboratories have full complements of analytical and laboratory support equipment for a wide range of analyses. The modules are designed to accommodate the linear robotic analysis systems which are being developed commercially and at the Los Alamos National Laboratory.

<The Aquatic Biomonitoring Laboratory monitors for environmental hazards and is capable of verifying groundwater cleanliness at levels below the sensitivity of current chemical analyses.

<The Field Analytical Laboratory contains equipment for rapid field detection of contaminants. The Laboratory automatically transmits field data, including measurement position, directly to the RTAL's computers.

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<The Robotics Base Station provides housing and operations control for the robotic field sampling and robotic monitoring systems that are currently available and under development.

<The Decontamination/Sample Screening Module provides a decontamination shower for personnel working (in protective ensembles) in contaminated areas and also provides a hot cell, glove box and hood for initial screening of samples.

<The Operations Control Center integrates laboratory and field activities and data analysis to ensure efficient performance of all phases of RTAL work functions.

<The Protected Living Quarters Module provides full facilities for 5 operators and is deployed only for operations in remote areas where it would be inefficient to bring in new personnel every 8-12 hours.

### **Benefits:**

<Analysis of a full range of radiological, chemical and biological contaminants and constituents at highest levels of accuracy and quality assurance

<Robotics incorporated to maximize efficiency

<Dramatic reduction in analytical costs and turnaround time (provides full range of analyses within 16 hours)

<Achieves a processing goal of 20 samples per day by means of the integrated laboratory system

<Full protection for operating personnel and sensitive analytical equipment against the radiological and environmental hazards encountered at DOE sites

<System easily modified to site needs since modules are fully road transportable, independent, and highly flexible

### **Status and Accomplishments:**

This project was successfully completed in September

1996. Demonstration of the RTAL system Organic Chemical, Radioanalytical, and Operation Control Center Laboratory modules was completed in January 1996. Demonstration of the RTAL system Inorganic Chemical and Aquatic Biomonitoring Laboratory modules was completed in April 1996.

In 1997, on request from the DOE Fernald - Site Operations Office, Organic Chemical, Radioanalytical, and Operations Center laboratory modules were sent to the Fernald Environmental Management Project (FEMP) site for deployment by waste generating services. These RTAL modules are available to other DOE sites when not in use at the FEMP site.

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### **Online Resources:**

Office of Science and Technology, Technology Management System (TMS), Tech ID # 292  
<http://ost.em.doe.gov/tms>

The National Energy Technology Laboratory Internet address is <http://www.netl.doe.gov>

The Internet address for the RTAL Innovative Technology Summary Report is <http://ost.em.doe.gov/efd/indp/itsrs/rtal1/rtal1.pdf>

